

predetermined circuit is formed. A through opening is provided in the circuit board. An electronic component is attached to the one surface of the circuit board to extend across the through opening. A thermal fuse is provided on the other surface of the circuit board to enter the through opening. The thermal fuse responds to temperature of the electronic component via a heat-conducting insulating member filling the through opening for breaking the predetermined circuit.

This claimed structure provides the specific and unobvious advantage of the mounting of a thermal fuse in a considerably smaller space such as in a notebook computer by a major reduction in the height of the assembly while ensuring the monitoring of temperature increase of a particular electronic component with increasing the thickness of the assembly.

Figures 2, 3A and 3B, together with the section in the specification labeled "Background Art," teach that it was well known in the art at the time the invention was made to mount a thermal fuse 34 on one surface of a circuit board 31. The thermal fuse 34, shown in Figure 3A, is mounted on the same side of the circuit board and in close proximity to electronic components 32. Thermal fuse 34 is thermally connected to electronic devices 32 with a heat-conducting insulating material, such as silicone resin.

The AAPA fails to teach the claimed invention since there is no teaching of the through opening with the thermal fuse and the electric components being arranged across the opening and on opposite sides of the circuit board.

The Examiner cites Saito as curing this deficiency in the AAPA. Saito teaches an electronic component shielding device. In the embodiment of the shielding
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device shown in Figure 1, an recess 11 is formed in the circuit substrate 14 , but not in shielding 15 for containing and shielding the electronic component 21.

Thus, there is no through opening in the circuit board.

The Examiner's characterization of Saito and its teachings are respectfully traversed. Applicant can find no structure taught in the reference bearing the reference numbers supplied by the Examiner. It appears that the Examiner is impermissibly using the reference numbers from the present application and not specifically identifying the structure in the reference that is being relied upon. Further, the Examiner pointed to certain locations in the reference as supporting motivation for the combination. However, none of the citations in any way state or imply what the Examiner is holding.

Saito addresses the problem of providing shielding for electronic circuits without using a metallic case or cap. Accordingly, Saito teaches mounting a second electronic component 21 to the under side of a first electronic component and placing the second electronic component 21 between the first electronic component 16 and the shielding layer 15 in order to shield the second electronic component from radio waves. Thus, it appears that Saito teaches placing the second electronic component 21 in a recess in the substrate in order to shield the second electronic component 21.

The Office Action asserts that Saito teaches that the second electronic component 21 is provided or mounted on the opposite surface of the circuit substrate 14 from the first electronic component 16. However, it is clearly illustrated in Figure 1 that only shield 15 is located on the opposite side (other surface) of the
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circuit substrate 14. Furthermore, it does not appear that Saito teaches filling the opening 11 with an insulating member. In fact, if the second electronic component 21 were mounted on the surface of circuit substrate 14 opposite the surface that electronic component 16 is attached to, then the second electronic component 21 would either not be protected by shield 15, would require a metallic case or cap, or a third electronic component acting as a shield.

Accordingly, if the AAPA and Saito were combined, the resulting configuration would have the thermal fuse mounted to the underside of the electronic component with the fuse located in a recess underneath the electronic component. It appears' however that thermal fuses do not require shielding from radio waves or electromagnetic radiation. Consequently, shield 15 would not be required. However, since shield 15 is not used, there appears to be no motivation to combine this references. Accordingly, it may not be obvious to one of ordinary skill in the art to combine Saito with the AAPA.

The citation of In re Japikse, 181 Fed 1019, (CCPA, 1050) is not applicable to this application. The applicant has done more and claimed more that moving one part of an apparatus to a different location with no other change in the structure or operation of the apparatus. Instead, there is no teaching or suggesting in the art of providing the through opening with a component, namely the thermal fuse entering the opening from the other side of the circuit board with the electronic component extending across that opening and being coupled to the thermal fuse by the heat-conducting insulating member which fills the through opening.

There is no teaching or suggestion in the art of providing a through opening in the circuit board to reduce the thickness of the assembly by enabling the positioning of the thermal fuse to enter the through opening from the other side of the circuit board and the electronic component to extend across the opening. This considerably reduces the thickness. In addition, the thermal fuse of the present invention is not simply placed directly on the circuit board as in the AAPA or in a recess in the board as suggested by the Office Action, but is placed in the through opening and coupled to the electronic component through the heat-conducting insulating member which fills the through opening. Heat generated from the component is not trapped in the circuit board or in any recess, which means that the temperature of the component can accurately be monitored. Further, as the component and the thermal fuse are coupled by the insulating member filling the through opening, the mechanical strength of the component located at the through opening is ensured.

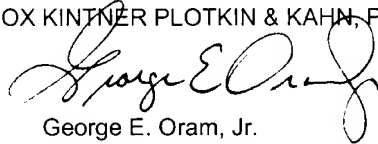
Consequently, for all of the above reasons, it is strongly contended that certain clear differences exist between the present invention as claimed and the prior art relied upon by the Examiner. It is further contended that these differences are more than sufficient that the present invention as claimed was not anticipated and would not have been obvious to a person of ordinary skill in the art at the time the invention was made viewing that prior art.

Accordingly, the Examiner is respectfully requested to withdraw the rejection, indicate the allowability of Claims 1 - 4, and pass this case to issue.

In the event this paper is not considered to be timely filed, the applicants respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees that may be due with respect to this paper may be charged to Counsel's Deposit Account No. 01-2300.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "George E. Oram, Jr.", written over the printed name.

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